WHAT IS CLAIMED IS:

1. A method for improving corrosion resistance of a turbine engine rotor component, the method comprising the step of implanting aluminum ions, chromium ions, or mixtures thereof on the surface of the component.

2. The method of claim 1 wherein the rotor component is a compressor or turbine disk or seal element.

3. The method of claim 1 wherein the rotor component has a service operating temperature of from about 540°C to about 815°C.

4. The method of claim 1 further comprising implanting yttrium ions, cerium ions, zirconium ions, hafnium ions, or silicon ions, or mixtures thereof, on the surface of the component.

5. The method of claim 1 wherein the ions are implanted to a depth of up to about 2 microns.

6. The method of claim 5 wherein the ions are implanted to a depth of from about 0.1 to about 0.5 microns.

7. The method of claim 1 wherein the ion implantation is conducted at a temperature of from about 20°C to about 700°C.

8. The method of claim 7 wherein the ion implantation is conducted at a temperature of from about 20°C to about 320°C.

9. The method of claim 8 wherein the ions are implanted to a depth of from about 0.1 to about 0.5 microns.

10. The method of claim 1 further comprising the step of heating the implanted component in a nonoxidizing atmosphere to a temperature of from about 500°C to

about 800°C to diffuse the ions into the surface of the component.

11. The method of claim 9 further comprising the step of heating the implanted component in a nonoxidizing atmosphere to a temperature of from about 600°C to about 700°C to diffuse the ions into the surface of the component.

12. The method of claim 1 further comprising the step of heating or maintaining the implanted component at a temperature of from about 450°C to about 800°C in the presence of oxygen to form an oxide coating on the surface of the component.

13. The method of claim 9 further comprising the step of heating or maintaining the implanted component at a temperature of from about 600°C to about 700°C in the presence of oxygen to form an oxide coating having a thickness of from about 0.5 to about 3 microns on the surface of the component.

14. A method for improving corrosion resistance of a turbine engine rotor component, comprising the steps of:

(a) providing a rotor component selected from the group consisting of compressor and turbine disks and seal elements;

(b) implanting aluminum ions, chromium ions, or mixtures thereof on the surface of the rotor component to a depth of up to about 2 microns; and

(c) heating the implanted component in the presence of oxygen to form an oxide coating on the surface of the component.

15. The method of claim 14 wherein the rotor component has a service operating temperature of from about 540°C to about 815°C.

16. The method of claim 14 further comprising implanting yttrium ions, cerium ions, zirconium ions, hafnium ions, or silicon ions, or mixtures thereof, on the surface of the component.

17. The method of claim 14 wherein the ion implantation is conducted at a temperature of from about 20°C to about 320°C.

18. The method of claim 17 wherein the ions are implanted to a depth of from about 0.1 to about 0.5 microns.

19. The method of claim 14 comprising the step of heating the component to a temperature of from about 450°C to about 800°C in the presence of oxygen to form an oxide coating having a thickness of from about 0.5 to about 3 microns on the surface of the component.

20. The method of claim 18 comprising the step of heating the component at a temperature of from about 600°C to about 700°C in the presence of oxygen to form an oxide coating having a thickness of from about 0.5 to about 3 microns on the surface of the component.

21. A turbine engine rotor component having improved corrosion resistance comprising a metal-based substrate having implanted aluminum ions, chromium ions, or mixtures thereof on the surface of the substrate.

22. The rotor component of claim 21 that is a compressor or turbine disk or seal element.

23. The rotor component of claim 21 further comprising implanted yttrium ions, cerium ions, zirconium ions, hafnium ions, or silicon ions, or mixtures thereof, on the surface of the component.

24. The rotor component of claim 21 wherein the ions are implanted to a depth of up to about 2 microns.

25. The rotor component of claim 24 wherein the ions are implanted to a depth of from about 0.1 to about 0.5 microns.

26. The rotor component of claim 25 wherein the ion implantation is conducted at a temperature of from about 20°C to about 320°C.

27. The rotor component of claim 21 further comprising an oxide coating on the surface of the component.

28. The rotor component of claim 26 further comprising an oxide coating on the surface of the component.

29. The rotor component of claim 28 wherein the oxide coating is formed by heating the component to a temperature of from about 600°C to about 700°C in the presence of oxygen to form an oxide coating on the surface of the component.

30. The rotor component of claim 29 wherein the oxide coating has a thickness of from about 0.5 to about 3 microns.